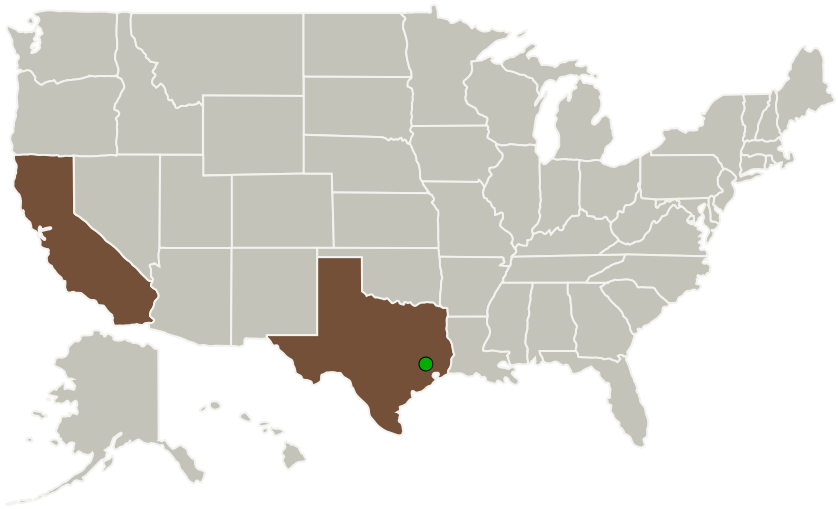
Additively Manufactured Monolithic LOx/Methane Vortex RCS Thruster, Phase II

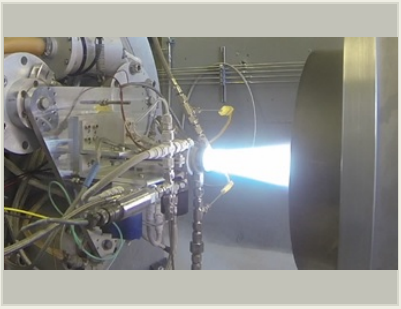
Completed Technology Project (2016 - 2018)

Project Introduction

Parabilis Space Technologies proposes to advance development of an additively manufactured liquid oxygen (LOx) and liquid methane Reaction Control System (RCS) thruster in response to solicitation H2.01, In-Space Chemical Propulsion. This RCS-class thruster will provide a simple, robust, and low-cost solution for vehicle attitude control on upcoming NASA projects. The thruster is additively manufactured in a single monolithic structure with minimal secondary processing. During Phase I, a prototype thruster was successfully designed, fabricated, and test fired multiple times. Phase II efforts include furthering the development of the thruster toward flight ready design, including expanding on additive manufacturing implementation and performing additional hotfire testing to evaluate a flight-like design and expand the operational envelope.

Primary U.S. Work Locations and Key Partners





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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Parabilis Space Technologies, Inc.	Lead Organization	Industry Historically Underutilized Business Zones (HUBZones)	SAN MARCOS, California
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
California	Texas

Project Transitions

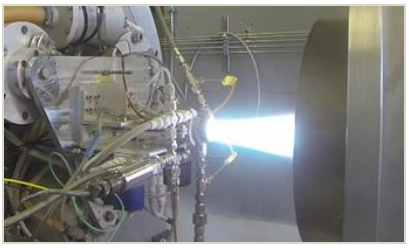
April 2016: Project Start

August 2018: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139637)*

Images



Briefing Chart Image
Additively Manufactured Monolithic LOx/Methane Vortex RCS Thruster, Phase II
(https://techport.nasa.gov/image/133179)

Final Summary Chart Image
Additively Manufactured Monolithic LOx/Methane Vortex RCS Thruster, Phase II
(https://techport.nasa.gov/image/127602)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Parabilis Space Technologies, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

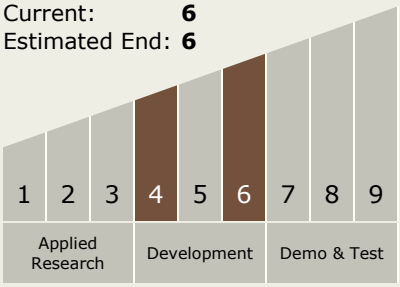
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Christopher S Grainger

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.2 Electric Space Propulsion
    - TX01.2.1 Integrated Systems and Ancillary Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System